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January 10, 2011

Mail Stop Certificate of Corrections Branch
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Re: U.S. Patent No.: 7,574,282 B2
Issued: August 11, 2009
Inventor: Ulf Petersson et al.
Our Docket: ABE1-37204

Sir:

A Certificate of Correction under 35 U.S.C. 254 (PTO's error) is hereby requested to correct Patent Office printing errors in the above-identified patent. Enclosed herewith is a proposed Certificate of Correction (Form No. PTO-1050) for consideration along with appropriate documentation supporting the request for correction.

It is requested that the Certificate of Correction be completed and mailed at an early date to the undersigned attorney of record. The proposed corrections are obvious ones and do not in any way change the sense of the application.

We understand that a check is not required since the errors were on the part of the Patent and Trademark Office in printing the patent.

Very truly yours,

Ronald M. Kachmarik

RMK/jrj
Encl

PTO/SB/44 (09-07)
Approved for use through 08/31/2013. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

(Also Form PTO-1050)

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 7,574,282 B2

APPLICATION NO.: 10/516,793

ISSUE DATE : August 11, 2009

INVENTOR(S) : Ulf Petersson et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 11, line 9, please delete "180degrees" and insert --180 degrees--;
Column 12, line 15, please delete "claim 14" and insert --claim 10--;
Column 12, line 17, please delete "claim 14" and insert --claim 10--.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

Ronald M. Kachmarik/Pearne & Gordon LLP
1801 E. 9th Street, Suite 1200
Cleveland, Ohio 44114-3108

3. Method according to claim 2 characterised in that the device (5), when moving in a course direction and senses an unchanged magnetic field strength (44,54), changes directions 90degrees, that the device, when moving in a course direction and senses an increased magnetic field strength (44,54), continues in the same course direction and that the device, when moving in a course direction and senses a decreased magnetic field strength (44,54), changes course directions 180degrees.

4. Method according to claim 2 characterised in that the device (5) moves in a course direction that corresponds to that the sensed magnetic field (44, 54) is constant.

5. Method according to claim 2 characterised in that the device (5), when sensing that the magnetic field (44,54) changes directions (55), continues to move a certain distance in the same direction, then stops and turns until it again detects that the magnetic field (44,54) changes directions (55), whereupon it moves essentially in the same direction as a line (55), which ties together points where the sensed magnetic field (44,54) changes directions.

6. Method according to claim 1 characterised in that the sensing unit (14,15,16), when sensing the magnetic field (43, 52) within the range of the navigational control station (3), adapts its processing of the sensed magnetic field (43,52).

7. Method according to claim 1 characterised in that at least one signal generator (1) sends a first current trough the navigational control station (3), whereby the magnetic field (43, 44), generated by the current at a point of time mainly inside the range of the navigational control station (3), has a direction essentially opposed to the direction of the magnetic field (43,44) at the same point of time mainly outside of the mentioned range.

8. Method according to claim 1 characterised in that at least one signal generator (1) sends a second current through the navigational control station (3) and the mentioned (1) or another signal generator (1) sends a third current through the navigational control station (3), whereby the magnetic field (43,44), generated by the second current in a second area mainly within the range of the navigational control station (3), at a point of time has a direction essentially corresponding to the direction (46) of the magnetic field (43,44) generated by the third current at the same point of time in a third area mainly within the range of the navigational control station (3).

9. Method according to claim 8 characterised in that the second current corresponds to the third current.

10. Method according to claim 1 characterised in that at least one signal generator (1) sends a second current trough the navigational control station (3) and the mentioned (1) or another signal generator (1) sends a third current through the navigational control station (3), whereby the magnetic field (52,54), generated by the second current in a second area mainly within the range of the navigational control station (3), at a point of time has a direction essentially opposite to the direction (50,51) of the magnetic field (52,54) generated by the third current at the same point of time in a third area mainly within the range of the navigational control station (3).

11. Method according to claim 8 characterised in that the direction (46,50,51) of the magnetic fields (43,44,52,54) generated in the second and third areas depend on the properties of the sent currents.

12. Method according to claim 8 characterised in that the magnetic field's (43,44,52,54) direction (46,50,51) within the second and the third areas respectively at a point of time depends on the properties and the occurrence of current pulses (7,9,11).

13. Method according to claim 8 characterised in that when a first current pulse N7 (9) occurs, the magnetic field (54) in the second area, at a point of time, shows a direction (50) essentially opposed to the direction (51) of the magnetic field at the same point of time in the third area and when another current pulse F9 (11) occurs, the magnetic field (54) in the second area, at a point of time, shows a direction (46) essentially corresponding to the direction (46) of the magnetic field in the third area.

14. Method according to claim 10 characterised in that outside and within the range of the navigational control station an undefined area (55) is created that essentially defines two areas, which at a point of time have magnetic fields essentially opposed to each other.

15. Method according to claim 14, wherein the second current corresponds to the third current.

16. Method according to claim 14, wherein the direction of the magnetic fields generated in the second and third areas depend on the properties of the sent currents.

17. Method according to claim 1 characterised in that at least one current in the system constitutes a sinus component.

18. Method according to claim 1 characterised in that at least one current sent in the system most of the time is in a state of rest when it is mainly constant, whereby periodically the state of rest is interrupted by at least one characteristic reference current pulse (7,9,11).

19. Method according to claim 18 characterised in that the sensing unit (14,15,16), knowing the properties of the reference pulse (7), adapts the time intervals within which the sensing unit (14,15,16) sense magnetic fields.

20. Method according to claim 19 characterised in that adaptation means that the sensing unit (14,15,16) synchronises the unit's (14,15,16) working frequency in the time domain based on the reference current pulse (7).

21. Method according to claim 19 characterised in that adaptation means that the sensing unit (14,15,16) synchronises the properties of the time intervals in the time domain based on the properties of the reference current pulse (7,9,11).

22. Method according to claim 18 characterised in that each signal generator (1) in the navigational control system synchronises its sent current pulses (7,9,11) with the other current pulses (7,9,11) in the system so that no current pulses (7,9,11) coincide at the same time during the same signal period (8).

23. Electronic navigational control system for a self-propelling device (5), the system comprising at least one navigational control station (3) with at least one loop (4) connected to at least one signal generator (1) and a sensing unit (14,15,16) arranged at the self-propelling device (5), whereby the sensing unit (14,15,16) senses at least one time and space varying and in the air medium propagating magnetic field, at least transmitted via the at least one loop (4),in turn re-transmitting at least one, by the sensing unit (14,15,16) processed, signal to at least one driving source that contributes to the device's movements across an area, the system comprises means by which the signal generator (1) sends a current through the at least one loop (4), the current generating the time and space varying magnetic field (43,44,52,54), whereby the sensing unit (14,15,16) comprises means by which the device (5) is maneuvered based on the properties of the sensed magnetic field (43,44,52,54), characterised in that that said sensed magnetic field (43,44,52,54), in an area enclosed by said loop (4), at least at one point of time has different directions (50,51).

24. Electronic navigational control system according to claim 23 characterised in that at least one current being sent in the system during the main part of the time is in a state of rest,

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	10/516,793	Confirmation No.	7321
Applicant	:	Petersson, Ulf		
Filed	:	07/11/2005		
TC/A.U.	:	3664		
Examiner	:	Marc McDieunel		
Title	:	Electronic Directing System		
Customer No.	:	000,116		
Docket No.	:	ABE1-37204		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT "A"

Sir:

This amendment is filed in response to the Official action mailed October 17, 2008. The three month period for response expired on January 17, 2009. Accordingly, applicant respectfully requests and petitions that the response date be extended for three months, up to and including April 17, 2009. Please charge $1,110.00 to Deposit Account No. 16-0820, our Order No. ABE1-37204 for the extension of time fee.

Please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims that begins on page 2 of this paper.

Amendments to the Abstract begin on page 11 and include an attached replacement sheet.

Remarks/Arguments begin on page 12 of this paper.

An **Appendix** including an amended Abstract is attached as page 14 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): Method for maneuvering a self-propelling device (5) towards a navigational control station (3) by means of an electronic navigational control system comprising at least said navigational control station (3) with at least one loop (4) connected to at least one signal generator (1) and one sensing unit (14,15,16) arranged at the self-propelling device (5), whereby the sensing unit (14,15,16) at least senses an, in the air-medium propagating, time and space varying magnetic field, transmitted by the ~~navigational control station (3)~~ at least one loop (4) and in turn retransmits at least one, by the sensing unit (14,15,16) processed signal to at least one drive source that contributes to the device's (5) movements across a surface, the signal generator (1) sends a current through the ~~navigational control station (3)~~ at least one loop (4), the current generating the time and space varying magnetic field (43,44,52,54), whereby the sensing unit (14,15,16) maneuvers the device (5) based on the properties of the sensed magnetic field (43,44,52,54),

characterised in that said sensed magnetic field (43,44,52,54), in an area ~~mainly within the range of the navigational control station (3)~~ enclosed by said loop (4), at least at one point of time has different directions (50,51).

Claim 2 (currently amended): Method according to ~~patent~~ claim 1 characterised in that the device (5), when moving mainly outside the range of the navigational control station and

sensing a change in the magnetic field (44,54), maneuvers itself in relation to the navigational control station (3) so that it by means of one or many maneuvers will approach, essentially stay at a constant distance from or distance itself from the navigational control station (3), alternatively stop and/or turn.

Claim 3 (currently amended): Method according to ~~patent~~ claim 2 characterised in that the device (5), when moving in a course direction and senses an unchanged magnetic field strength (44,54), changes directions 90 degrees, that the device, when moving in a course direction and senses an increased magnetic field strength (44,54), continues in the same course direction and that the device, when moving in a course direction and senses a decreased magnetic field strength (44,54), changes course directions 180 degrees.

Claim 4 (currently amended): Method according to ~~patent~~ claim 2 characterised in that the device (5) moves in a course direction that corresponds to that the sensed magnetic field (44, 54) is constant.

Claim 5 (currently amended): Method according to ~~patent~~ claim 2 characterised in that the device (5), when sensing that the magnetic field (44,54) changes directions (55), continues to move a certain distance in the same direction, then stops and turns until it again detects that the magnetic field (44,54) changes directions (55), whereupon it moves essentially in the same direction as a line (55), which ties together points where the sensed magnetic field (44,54) changes directions.

Claim 6 (currently amended): Method according to ~~patent~~ claim 1 characterised in that the sensing unit (14,15,16), when sensing the magnetic field (43,52) within the range of the navigational control station (3), adapts its processing of the sensed magnetic field (43,52).

Claim 7 (currently amended): Method according to ~~patent~~ claim 1 characterised in that at least one signal generator (1) sends a first current trough the navigational control station (3), whereby the magnetic field (43,44), generated by the current at a point of time mainly inside the range of the navigational control station (3), has a direction essentially opposed to the direction of the magnetic field (43,44) at the same point of time mainly outside of the mentioned range.

Claim 8 (currently amended): Method according to ~~patent~~ claim 1 characterised in that at least one signal generator (1) sends a second current through the navigational control station (3) and the mentioned (1) or another signal generator (1) sends a third current through the navigational control station (3), whereby the magnetic field (43,44), generated by the second current in a second area mainly within the range of the navigational control station (3), at a point of time has a direction essentially corresponding to the direction (46) of the magnetic field (43,44) generated by the third current at the same point of time in a third area mainly within the range of the navigational control station (3).

Claim ~~9~~ 10 (currently amended): Method according to ~~patent~~ claim 1 characterised in that at least one signal generator (1) sends a second current trough the navigational control station (3) and the mentioned (1) or another signal generator (1) sends a third current through the navigational control station (3), whereby the magnetic field (52,54), generated by the second

current in a second area mainly within the range of the navigational control station (3), at a point of time has a direction essentially opposite to the direction (50,51) of the magnetic field (52,54) generated by the third current at the same point of time in a third area mainly within the range of the navigational control station (3).

Claim ~~10~~ 9 (currently amended): Method according to ~~patent~~ claim 8 characterised in that the second current corresponds to the third current.

Claim ~~11~~ 14 (currently amended): Method according to ~~patent~~ claim 9 characterised in that outside and within the range of the navigational control station an undefined area (55) is created that essentially defines two areas, which at a point of time have magnetic fields essentially opposed to each other.

Claim ~~12~~ 11 (currently amended): Method according to ~~patent~~ claim 8 characterised in that the direction (46,50,~~5~~ 51) of the magnetic fields (43,44,52,54) generated in the second and third areas depend on the properties of the sent currents.

Claim ~~13~~ 17 (currently amended): Method according to ~~patent~~ claim 1 characterised in that at least one current in the system constitutes a sinus component.

Claim ~~14~~ 18 (currently amended): Method according to ~~patent~~ claim 1 characterised in that at least one current sent in the system most of the time is in a state of rest when it is mainly

constant, whereby periodically the state of rest is interrupted by at least one characteristic reference current pulse (7,9,11).

Claim 15 (currently amended): Method according to ~~patent~~ claim 14 characterised in that the sensing unit (14,15,16), knowing the properties of the reference pulse (7), adapts the time intervals within which the sensing unit (14,15,16) sense magnetic fields.

Claim 16 (currently amended): Method according to ~~patent~~ claim 15 characterised in that adaptation means that the sensing unit (14,15,16) synchronises the unit's (14,15,16) working frequency in the time domain based on the reference current pulse (7).

Claim 17 (currently amended): Method according to ~~patent~~ claim 15 characterised in that adaptation means that the sensing unit (14,15,16) synchronises the properties of the time intervals in the time domain based on the properties of the reference current pulse (7,9,11).

Claim 18 (currently amended): Method according to ~~patent~~ claim 14 characterised in that each signal generator (1) in the navigational control system synchronises its sent current pulses (7,9,11) with the other current pulses (7,9,11) in the system so that no current pulses (7,9,11) coincide at the same time during the same signal period (8).

Claim ~~19~~ (currently amended): Method according to ~~patent~~ claim 8 characterised in that the magnetic field's (43,44,52,54) direction (46,50,51) within the second and the third areas

respectively at a point of time depends on the properties and the occurrence of current pulses (7,9,11).

Claim 20 (currently amended): Method according to ~~patent~~ claim 8 characterised in that when a first current pulse N7 (9) occurs, the magnetic field (54) in the second area, at a point of time, shows a direction (50) essentially opposed to the direction (51) of the magnetic field at the same point of time in the third area and when another current pulse F9 (11) occurs, the magnetic field (54) in the second area, at a point of time, shows a direction (46) essentially corresponding to the direction (46) of the magnetic field in the third area.

Claim 21 (currently amended): Electronic navigational control system for a self-propelling device (5), the system comprising at least one navigational control station (3) with at least one loop (4) connected to at least one signal generator (1) and a sensing unit (14,15,16) arranged at the self-propelling device (5), whereby the sensing unit (14,15,16) senses at least one time and space varying and in the air medium propagating magnetic field, at least transmitted via the ~~navigational control station (3)~~ at least one loop (4), in turn re-transmitting at least one, by the sensing unit (14,15,16) processed, signal to at least one driving source that contributes to the device's movements across an area, the system comprises means by which the signal generator (1) sends a current through the ~~navigational control station (3)~~ at least one loop (4), the current generating the time and space varying magnetic field (43,44,52,54), whereby the sensing unit (14,15,16) comprises means by which the device (5) is maneuvered based on the properties of the sensed magnetic field (43,44,52,54),

characterised in that that said sensed magnetic field (43,44,52,54), in an area ~~mainly within the range of the navigational control station (3)~~ enclosed by said loop (4), at least at one point of time has different directions (50,51).

Claim 22 (currently amended): Electronic navigational control system according to ~~patent~~ claim 21 characterised in that at least one current being sent in the system during the main part of the time is in a state of rest, where it is essentially constant, whereby the state of rest is periodically interrupted by at least one characteristic reference current pulse (7,9,11).

Claim 23 (currently amended): Electronic navigational control system according to ~~patent~~ claim 21 characterised in that the navigational control station (3) comprises a first loop (6) which surrounds a first area, said loop extends in one plane.

Claim 24 (currently amended): Electronic navigational control system according to ~~patent~~ claim 23 characterised in that the navigational control station (3) comprises a second and a third loop (4), whereby the second loop (4) surrounds a second area and the third loop (4) surrounds a third area.

Claim 25 (currently amended): Electronic navigational control system according to ~~patent~~ claim 24 characterised in that the respective loop (4,6) extends in one plane.

Claim 26 (currently amended): Electronic navigational control system according to ~~patent~~ claim 23 characterised in that the plane extends parallel to the ground surface or vertical to the ground surface.

Claim 27 (currently amended): Electronic navigational control system according to ~~patent~~ claim 23 characterised in that at least one loop constitutes an electric conductor that is placed above, in or below the continuous surface across which the device is intended to move.

Claim 28 (currently amended): Electronic navigational control system according to ~~patent~~ claim 23 characterised in that at least one loop constitutes a continuous electric conductor that is wound in more than one turn.

Claim 29 (currently amended): Electronic navigational control system according to ~~patent~~ claim 28 characterised in that the electric conductor constitutes a fix guide path placed on a carrier.

Claim 30 (currently amended): Electronic navigational control system according to ~~patent~~ claim 21 characterised in that by a self-propelling device (5) is meant an operating robot comprising a operating system for working on the surface across which the robot is moving.

Claim 31 (currently amended): Electronic navigational control system according to ~~patent~~ claim 30 characterised in that the operating system is controlled based on information received and/or stored for processing by the sensing unit (14,15,16).

Claim 32 (currently amended): Electronic navigational control system according to ~~patent~~ claim 30 characterised in that the robot constitutes a lawn-mowing robot, whereby the operating system constitutes knives which, when moving, cut off the biological material growing on the surface.

Claim 33 (currently amended): Electronic navigational control system according to ~~patent~~ claim 30 characterised in that the robot constitutes a vacuum cleaning robot, whereby the operating system comprises the parts with which a vacuum cleaning robot is normally equipped for cleaning the surface from dirt, for instance a rotating brush and a suction device.

Claim 34 (currently amended): Electronic navigational control system according to ~~patent~~ claim 30 characterised in that the robot constitutes a cleaning robot, whereby the operating system comprises the parts with which a cleaning robot is normally equipped for cleaning the surface from dirt, for instance tools for wet-cleaning.

Claim 35 (currently amended): Method according to ~~patent~~ claim 9, wherein the second current corresponds to the third current.

Claim 36 (currently amended): Method according to ~~patent~~ claim 9, wherein the direction of the magnetic fields generated in the second and third areas depend on the properties of the sent currents.

Amendments to the Abstract:

A copy of the amended Abstract without editing notations appears in the appendix. This Abstract will replace the previous version in the application:

The present ~~invention~~ disclosure relates to an arrangement and an electronic navigational control system for a self-propelling device (5), preferably a lawn-mowing robot. The system comprises at lease one navigational control system (3) connected to at least one signal generator (1) and a sensing unit arranged at the self-propelling device (5). The sensing unit senses at least one, in the air medium propagating, time and space varying magnetic field, at least transmitted via the navigational control station (3) and in turn retransmits at least one signal processed by the unit to at least one driving source which contributes to the device's movements across the surface. The system comprises ~~means~~ structure by which the signal generator (1) sends a current through the navigational control station (3), the current generating the time and space varying magnetic field, whereby the sensing unit comprises ~~means~~ structure by which the device (5) is maneuvered based on the properties of the sensed magnetic field.

REMARKS/ARGUMENTS

Review and reconsideration of the subject application in view of the present amendment is respectfully requested.

By the present amendment, applicant amends claims 1-36. Claims 1-36 are currently pending in this application. Applicant respectfully requests reconsideration and allowance.

There are two independent claims pending in this application, namely claims 1 and 21. Claims 1 and 21 have been rejected under 35 U.S.C. 102 (e) as being anticipated by Bartsch et al., (US 6459955 B1). Claims 1 and 21 have been amended to specify that the navigational control station 3 includes at least one loop 4, the loop transmits a magnetic field, and a current is sent through the loop to generate a varying magnetic field. The current amendments to claims 1 and 21 define the present invention over the prior art reference because of the inclusion of the navigational control station 3 with the loop 4 used for navigation. The prior art reference includes other means for navigation. For example, Bartsch generally has a boundary wire 2 for delimiting the area where the robot works (however independent claims are not restricted in this respect). Additionally, the present invention is specifically intended to direct the robot towards the docking station (navigational control station 3). The loop 4 is for maneuvering the machine to the docking station with great accuracy in order to be able to dock properly, e.g. for recharging the battery.

US 6459955 is directed to a cleaner robot for indoor operation. It neither has a boundary wire nor a navigational control station with a loop for directing the machine towards it. On the contrary, the details referred to by the examiner are light fixtures 116 in the ceiling 114. The present invention includes boundary wire 2 and loop 4 are electrically conducting wires in which current signals are sent that generates magnetic fields in the surrounding. The present invention

discloses boundary wires that are located in the ground or on the surface of the ground. By contrast, US 6459955 utilizes a camera 112 for navigation of the robot.

In light of the foregoing, it is respectfully submitted that the present application is in a condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in a condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 16-0820, our Order No. 37204.

Respectfully submitted,

PEARNE & GORDON LLP

Ronald M. Kachmarik, Reg. No. 34,512

1801 East 9th Street
Suite 1200
Cleveland, Ohio 44114-3108
(216) 579-1700

Date: 17-Apr-09

ABSTRACT

The present disclosure relates to an arrangement and an electronic navigational control system for a self-propelling device (5), preferably a lawn-mowing robot. The system comprises at lease one navigational control system (3) connected to at least one signal generator (1) and a sensing unit arranged at the self-propelling device (5). The sensing unit senses at least one, in the air medium propagating, time and space varying magnetic field, at least transmitted via the navigational control station (3) and in turn retransmits at least one signal processed by the unit to at least one driving source which contributes to the device's movements across the surface. The system comprises structure by which the signal generator (1) sends a current through the navigational control station (3), the current generating the time and space varying magnetic field, whereby the sensing unit comprises structure by which the device (5) is maneuvered based on the properties of the sensed magnetic field.